Mathematics AI

Infinite Series and Multivariable Differential Calculus

Course Information

School year: 3rd, Required for all departments
Semester/Term: Spring (April - August)
Schedule: 90 minutes, twice a week (total 30 lectures)
Credit hours: 2
Prerequisites: Differential and integral calculus of a function of a single real variable

Course Description

Convergence of infinite series; Taylor expansion; partial and total derivatives; Taylor's theorem for multivariable functions; critical points of two-variable fuctions; Lagrange's multipliers method

Instructors

Hitoshi Saitoh (saitoh@), Yasuhito Kaminaga (kaminaga@), Tadashi Taniguchi (tani@), Hisashi Usui (usui@), Han Yoshida (han@), Shin'ya Fujita (fujita@) (Put "nat.gunma-ct.ac.jp" after "@.")

Course Outcomes

Upon completion of this course/program a student will be able to:

1. Understand the definition of convergence of an infinite series.
2. Discuss convergence/divergence of a positive series, and evaluate the sum of geometric series.
3. Expand elementary functions in Talor series.
4. Use complex exponential functions and Euler's formula.
5. Evaluate limits of functions of several variables.
6. Find equations of tangent planes to surfaces.
7. Apply the chain rule for partial derivatives to multivariable functions.
8. Calculate derivatives of functions defined implicitly.
9. Find and classify critical points of two-variable functions with Hessian determinant.
10. Use Lagrange's multipliers method to optimize functions of several variables with additional constraints.
11. Find equations of the envelopes of families of curves.

Textbook

Differential and Integral II (Second Edition)
by K. Arai, H. Usui, H. Saitoh, M. Suzuki, S. Takato and K. Mukouyama
Dainippon tosho, Tokyo, 2004.
pp.1-57 (in Japanese)
http://www.dainippon-tosho.co.jp/textbook/hs_uc/university_04.html

Grade Distribution

Midterm Exam: 40%
Final Exam: 40%
Assignments, Quizzes: 20%

Grading Policy and Criteria

Final grades will be a percentage of points earned versus points possible.

80 - 100%	A
70 - 79%	B
60 - 69%	C
Below 60%	D (disqualified)

Questions

Please contact one of the instrcutors listed above if you have questions or suggestions concerning the syllabus.